

ABSTRACT

A membrane device that receives a feedstock at a feed end face and separates the feedstock into a gas-phase permeate and retentate. The device has a membrane support containing at least one monolith of porous material defining a plurality of passageways extending longitudinally from the feed end face of the monolith to a retentate end face of the monolith through which the feedstock flows to pass retentate from the device. A permselective membrane coating is applied to the passageway wall surfaces of the monolith. At least one permeate conduit is formed within the monolith, the conduit containing a plurality of longitudinal permeate chambers communicating with a means of a sweep fluid introduction into the chambers and sweep fluid and permeate withdrawal from the chambers. The permeate is separated from feed and retentate, and the permeate is removed in a sweep fluid circulated through the permeate conduit.